

THE

# BRICKBUILDER

AN ILLUSTRATED MONTHLY MAGAZINE DEVOTED TO THE ADVANCEMENT OF BRICK ARCHITECTURE -  
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# The Brickbuilder.

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No. 6.

## THE BRICKBUILDER.

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In our last number, when speaking (apropos of the new Boston building law) of the increased recognition of the importance of brick and terra-cotta as fireproof and fire resisting material as exemplified in the provisions of that act, and the likelihood that the use of clay, fire made materials would constantly increase, we remarked that these facts and the new conditions of modern construction pointed to the desirability and the opportunity for a new development of brick and terra-cotta design in building, which should not only fulfil these practical conditions, but take advantage of them as suggestions for a new and consistent artistic treatment of clay materials. The advance that has already been made we can see by comparing the buildings of which the Madison Square Garden in New York is at once the type and the most successful example with such buildings as the Cotton Exchange in the same city. Successful as the last named building is, — at the time it was built it stood more solitarily as an artistic success than does Mr. Stanford White's *chef-d'œuvre*, — it is yet a less successful treatment of brick and terra-cotta as such, and recognizes less the character of the material in the design than does the more recent building, and we say this in full recognition of the utterly differing character and purpose of the two designs; which would render comparison of them in other respects inappropriate and profitless. But we look forward to still further development by means of a more complete and consistent use of brick and terra-cotta construction, and a frank expression of this construction in the design. Such development can only come about by solving each problem as it occurs with the single purpose of giving the most appropriate and most consistent expression to the conditions. To accomplish this advance brick architecture certainly needs closer study than it has yet received among us.

It is not only on the æsthetic side that brick as a building material needs further study. We need a better understanding than we now have of the purely practical and structural requirements necessary to produce the best possible brick, and the best possible brick building, under varying conditions. So long as brick was regarded as an inferior material, rule-of-thumb and hap-hazard methods were, if not well enough, at any rate all that was to be expected. But now that the clay materials are coming to be regarded more and more as the best building materials we have, it will rapidly become a matter of necessity to have a science of bricks and brickwork,

which shall deal exhaustively with clays, both before and after they are made into bricks. It is true, that clays have been analyzed, and bricks have been tested by methods more or less scientific. But the knowledge accumulated on this subject has hitherto been too unsystematic, and too uncertain to be of much practical value. Brick-makers will tell you, that analyses of clay are deceptive and misleading, and that after all there is nothing to do but to "experiment." And so every new brick concern and every old one that tries to improve its methods sinks a large amount of capital in experiments, the results of which are rarely scientifically examined, or tabulated, and which are kept more or less closely as trade secrets, while the less progressive concerns stick to rule-of-thumb methods and make but little progress.

What is needed is a careful, methodical, and scientific examination of the various clays, with a view to determining exactly what kinds of bricks can best be produced from each particular clay, and what are the methods of manufacture best adapted to produce the results desired in each particular case. Such an examination as we speak of, would involve, then, a thorough examination of the various brick machines and kilns in relation to the different clays, as well as an examination of the clays themselves. Further than this a true science of brickwork would give the precise qualities as to strength, fireproofness, resistance to atmosphere and frost which was to be expected from the various brick produced or producible, and the best methods of taking advantage of these qualities in building. Of course such knowledge as we here point out as desirable is not to be obtained all at once. Innumerable experiments by numbers of practical scientists and much time will doubtless be necessary before the present scattered and confused knowledge of the subject could be systematized and consolidated into anything that could truly be called a science. But a single, able man with the necessary scientific and practical knowledge could lay the foundation of such a science, and would undoubtedly find substantial reward in so doing, as, indeed, some of those who have brought scientific knowledge and research to bear upon the subject already have.

We do not for a moment suppose that, with regard especially to brickmaking, the scientist would supplant "the practical man." We well know that in no art is the knowledge that can only be acquired by practical experience, and which cannot be expressed in terms, more essential than in the art of brickmaking; but every intelligent brickmaker will admit, that such scientific knowledge as we have alluded to, would be an immense aid and immense saving of time, money, and annoyance in his work, and would certainly lead to improved results. Brickmaking should attract men of scientific training to its ranks; and as we have already said, such researches as we desire to see made should be undertaken by men who not only have that training, but are thoroughly conversant with the practical requirements of brickmaking.

That a more thorough and systematic knowledge of the qualities of various kinds of brick would be of the greatest advantage to the architect and the builder, will be still less likely to be disputed.

In the course of a review of Mr. Schuyler's volume of essays, entitled "American Architecture," apropos of his chapter "concerning Queen Anne," *The Architectural Review*, while admitting that the term has in this country come to be applied to "all nondescripts," undertakes to consider its cause and effects.

The remarks of the *Review*, as those of Mr. Schuyler, relate wholly to what in this country has been misnamed by the name of the worthy queen, who, though she was never credited with any great amount of taste, must turn in her grave at the way in which her name has been taken in vain. We must confess to no little surprise at finding two such authorities as Mr. Schuyler and the *Review* willing to treat with seriousness this abuse of the term, which has not even been consistently applied, so that it would be impossible to state definitely what is meant by those who use it. We scarcely remember to have heard any use of the term as applied to architecture in this country that was not deserving of ridicule, just as the poor queen's very name is constantly mispronounced "Annie". We have heard it used to describe buildings of utterly different character, of utterly different style, but we never remember, of late years, at any rate, to have heard it applied to such few buildings in this country as might with some show of propriety be referred to as in the style of Queen Anne.

We must also take exception to the statement of the *Review*, "that there ever was an actual Queen Anne style in England is not a matter of speculation but of denial." This certainly requires some qualification. Though perhaps not properly called "a style," the term "Queen Anne" has been in England very definitely applied to a group of buildings of distinct character, many of which, at any rate, were executed in the reign of the much abused queen.

But in order to do what little we may to aid in laying this Queen Anne ghost, let us state the facts, — if indeed the ghost has not already materialized so far as to be beyond exorcism, — and truly the case is much like that of the shadow who finally succeeded in usurping the place of the man. We fully expect this mongrel American humbug will rise up and say, "I am the true Queen Anne; the English Queen Anne never existed and, anyway, she's been dead since long ago."

The facts with regard to the use of the term are as follows: In England it has been used to designate the brick architecture of the later English Renaissance. Subsequent to the fire of London in 1666 the city was, by royal ordinance, rebuilt of brick instead of in half timber as it had been, and this fact, together with Dutch influence, which came in especially under William of Orange, gave great impulse to the use of brick everywhere in England. Classical forms were used as a matter of course, and often considerable ingenuity was shown in adapting them to brick construction; moulded brick, generally rubbed, was largely used and carved brick ornament, but great ingenuity was also shown in the use of projecting courses of plain bricks in the place of mouldings. The Gothic fancifulness which persisted longer in England than almost anywhere else largely influenced and modified the use of classical forms, especially in the country, where this influence was strongest, where the stricter classicism of Wren did not penetrate, and where the style, if we may so call it, received its most characteristic development, especially in domestic work. Tall brick chimney tops of rich and varied design, and scrolls and scroll work executed in brick, are characteristic features of the style, which might be briefly characterized as Renaissance architecture in brick, modified by the remnants of English Gothic feeling and by some Dutch influence. It was, to some extent, contemporary with our early colonial work, but was characterized by heavier detail throughout, as well as by being distinctively a brick style.

The term we are discussing applies, then, as originally used, to brick architecture especially, and its application to our wooden buildings is therefore the more absurd. Subsequent to the Gothic revival in England, when that movement had spent its force, a number of clever architects in England, of whom Mr. Norman Shaw was perhaps the most prominent, abandoned their previous Gothic work, and headed what was known as the Queen Anne revival, and

a large number of interesting brick buildings were produced under this influence. Every English movement in architecture finds more or less reflex in this country. Here, also, buildings were produced calling themselves Queen Anne, and some might fairly be so-called. Such are, in Boston, the Children's Hospital on Huntington Avenue, by Bradlee, Winslow & Wetherell, Dr. Shattuck's house on Marlboro Street, by Cabot & Chandler, and a few other houses in the Back Bay district. But our suburban domestic architecture is, for the most part, of wood, and when the attempt was made to translate this brick style into wood, monstrosities constantly worse and worse were the result, and were misnamed Queen Anne. A little later than this a more consistent wooden style began to be developed, mainly under the influence of Mr. Richardson and Mr. McKim, in which shingles were used as a wall covering, and the general form of the house was made attractive and picturesque, while the detail was exceedingly simple. This naturally had some influence on the builders of the monstrosities called "Queen Anne," but the public to whom the term meant anything different from the French roofed and jigsaw-disfigured house to which it had been accustomed, called all these new methods of building indifferently, "Queen Anne." This, we believe, is the history of the use and misuse of the term, which, we repeat, applies properly only to a particular style of brick architecture. At some future time we may take occasion to speak further of this development of brick architecture in England, and hope to give some illustration of the best examples of the style, old and new; for, though by no means in all respects exemplary work, there is yet much in it that is suggestive.

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We print in another column a letter from a correspondent suggesting that we made a mistake in stating in our description of THE BRICKBUILDER design for a church that the brick should be laid in white mortar. It is true that the conventional taste of the day prefers red or brown mortars, but for a reason precisely opposite to that which our correspondent supposes. Not in order to distinctly mark the individual bricks, but in order to produce a uniform and monotonous wall surface, are the dark mortars preferred. We have already in these columns given the reasons why a wall surface of monotonous color is objectionable. In lacking variety it lacks interest. In such large wall surfaces as our church design presents, the monotonous effect produced by using red mortar with red brick would be especially objectionable, and the deep red color so produced would be less pleasant than the gray red that would result from using white mortar. True, the white mortar would somewhat tone down with age, but it would not become red, but would still present a contrast to the bricks which, with time, are themselves somewhat modified in color.

Our brick-built streets would present a much pleasanter and softer color to the eye if white mortar were used instead of the usual colored mortars. If the natural color of the mortar is to be modified at all, it would be better, in most instances, to use a white putty for pointing and this has often been done with excellent effect.

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The introduction into Germany of facing bricks so constructed as to be readily divided into halves and quarters appears to be a revival of mediæval methods. Herr W. Narden of Cassel, Germany, writing to the *Deutsche Bauzeitung*, calls attention to this fact and urges the more general adoption of such bricks from a standpoint of economy. Herr Narden has had long experience in the restoration of old brick edifices, and claims that this kind of brick was fully perfected in the Middle Ages.

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Competition No. 7 will be announced in the next number. It will consist of a brick cottage for a moderate sized lot, just the problem that occurs in nine out of ten cases. The awards will bring out good talent.





FIG 1.

### A PLEA FOR THE MORE GENERAL USE OF BRICK IN OUR SUBURBAN HOUSES.

The first general impression left in the mind of the writer on contemplating for the first time the ordinary wooden house of this country was anything but satisfying. Had this impression been the result of mere sentiment, an association of ideas, or a bias in favor of old English domestic architecture, a residence of sixteen years in this country would long ago have obliterated all this; but the feeling of unsatisfactoriness remains, and must be resultant from some rational causes. Let us analyze the subject. First, the wooden house, as we construct it, suggests no idea of permanency. Structurally considered, it is more nearly allied to a tent, and lacks solidity, which is an important element in all good architecture. For the same reason an iron frame building, covered with corrugated iron, is never satisfactory. The wooden house appears like a shell; it is "thin" and "edgy"; its angles and lines are painfully straight and regular, no matter how long it may be exposed to the weather, and it never seems to get united with the ground on which it stands in the way that a brick or stone structure does.

The base of a stone or brick building may step up or down to suit the inequality of the ground; but the base of a wooden building is no longer structurally a "base"; it becomes a "water table," and forms generally a level line marking the bottom of what suggests a huge wooden box.

At the present time we are the only people who build in this way, and the chief reason we do so is presumably because it is "cheap." But there must be something wrong about this, for even wealthy and well-to-do citizens build wooden houses. If we look a little deeper



FIG 2.

another reason may come to the front, and a popular one, to wit, — "We can get more show for the money."

A gentleman recently had built for him a brick house colonial in style. His architect advised him to finish the brick wall with a simple brick or stone cornice, and he would then have an enduring building which his successors would be proud of. He replied that he was building for himself, and did not care a rap for his descendants, so the cornice was made of wood, and enriched with many yards of egg and tongue ornament, and modillions. He has "more show for the money."

All this I am afraid is characteristically American. The architecture of a nation reflects its character, and the wooden house is simply typical of our times.

But there are other reasons why wooden houses are objectionable. Compared with brick or stone the wooden house is highly combustible, and in danger from fire. It is also more difficult to heat in winter or keep cool in summer, and in order to preserve the exterior, it needs painting more or less frequently. Further, we are using up rapidly our supplies of timber, which should be kept for interior work, or such purposes as only wood can serve.

About seven years ago the writer advocated in the *American Architect* the use of plaster on the exterior of houses, and in that article contrasted the way in which wood was used in England during the sixteenth and seventeenth centuries, with the later colonial work in this country. In the former the wood, mostly oak, was worked out of the solid, retaining unmistakably its wooden character, whilst in the latter the wood was moulded in thinner pieces, built up, and imitated stone construction. Of course we admire the colonial work for its classical proportions and its refined detail; but, after all, when we come down to first principles, the earlier work, with its breadth, honesty, and solidity, is the nobler architecture.



FIG 3.

It may perhaps seem hopeless to preach the gospel of high art to a people who, for the most part, are, concerning architecture, blind or indifferent. Nevertheless we know that in all progressive countries — and this country is one of them — a certain number are in advance of the rest. While these exist, there is hope for social reform, there is hope for art. To such I would say, Can any observant and thoughtful person travel through the southern rural parts of England without admiring the picturesque beauty of the old villages? The warm red brick of the cottage walls, the tile roofs, the creamy colored plaster work, and rich amber color of the wood work, the open casements, all go to form a pleasing picture. Could any one, with the least artistic sense, look upon such dwellings without being conscious of the homelike feeling and the poetry of life which they express? And then, we might ask ourselves, Is our own life so different, so much less restful, that such architecture is wholly unsuitable for us? Surely not, unless the sense for art and poetry has wholly left us. Perhaps we must look to the sympathy and encouragement of the artists and poets in our endeavor to build more beautiful dwellings. But to come down to mundane things, let us consider what materials we have, and how they can be artistically used. First, then, we have good bricks, terra-cotta, and tiles of all kinds, and they are just as needful, just as suitable in this climate, as in England or other parts of the world. We have also in these days much variety of color in our materials — another

valuable medium for the artist to work with. Photography has brought us examples of artistic brickwork from all parts of the world, so that if we fail in achieving great results, the fault lies with our designers. Ruskin says somewhere, "A nation must build well in brick before it can build well in marble"; and truly the humbler material needs even more care and consideration.

A design which looks well on paper may look disappointing in execution, perhaps because such apparently simple things as the texture of the bricks, or the size of the joints and the color of the mortar, have not been considered, or perhaps the materials which come next to the brick do not harmonize with it.

When we have two materials, such as stone and brick, to work together, nothing looks worse than to see the stone used in the main wall, and brick as quoins at the angles. There is a house across the street from me where the architect faced an outside chimney with granite and used brick for the quoins!

There seems to be a prejudice against using brick under-

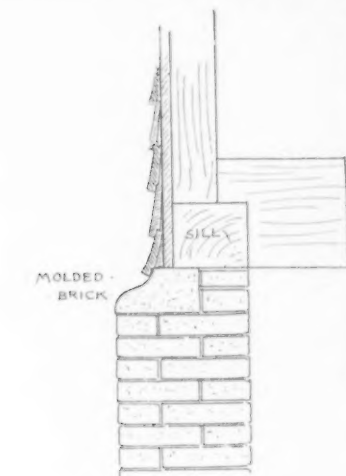


FIG. 4.

pinning to wooden buildings, perhaps owing to the porosity of most cheap bricks. But this can be overcome by using damp proof courses, and an advantage is gained in the readiness with which door and window jambs can be built, and the increased space which a thinner wall gives in the cellar.

Reference has been made to the absence of a base in wooden buildings; but where brick is used for the underpinning, and the sill set far enough back, a good effect can be had by finishing the brickwork with a moulded brick set in cement under the water-table, thus (see sketch, Fig. 4):—

In England, at the present time, there are many country cottage houses being built with brick walls, coated on the outside with cement. As the common stock brick is used for this purpose, a cottage can be built cheaply and yet be artistic looking.

A London architect has designed a number of these houses, chiefly for artists who appreciate their simplicity and picturesque appearance. They give the opportunity to use color in a way that renders them still more beautiful. The wall filling of rough plaster is generally white or cream color; the timber in gables and elsewhere either dark brown or black, being sometimes coated with tar for preservation. The red or brown tile roof, with a liberal projection to the eaves, crowns the whole.

Where cheapness is a prime necessity, such a mode of brick

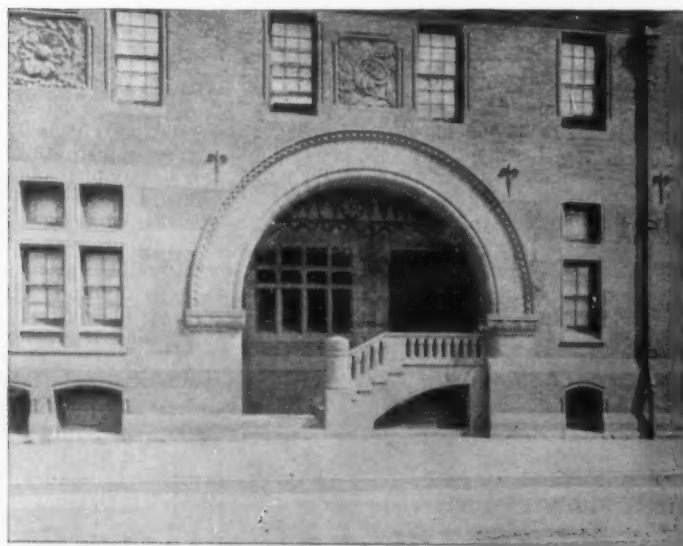


FIG. 5.



FIG. 6.

building might be advantageously used in this country in our suburban districts.

The hard, uneven clinker bricks would make a good wall to keep out water, and with a thick coat of "rough cast" on the outside, it would be cheap and serviceable. The quoins and jambs could be built with a better class brick set flush with the outer face of cement.

As a sort of compromise between brick and wood building, in houses of two stories, the lower story might be built of brick and the upper framed with wood, and either plastered or shingled outside. By projecting some parts of the frame over the brickwork below, or by building courses of moulded corbelling bricks at the junction of the brick wall and the work above, a good effect can be obtained. The house built for Mr. Neil McNeil, the builder in Dorchester, from designs by Mr. E. J. Lewis, Jr., is a good example of this style of building; also the modern English cottage near Colchester, by Mr. W. H. Atkin Berry, of which two views are given (Figs. 2 and 3), taken from *The Building News*, showing the use of tiles on the roofs and chimney gables, as well as of brick in the first story with wood and plaster above. Plate 41 also shows two examples of similar treatment, the upper one taken from the *British Architect*, the lower from the *The Building News*. In the larger house, Wightwick Manor, the lower story and tower are of Ruabon bricks and terra-cotta, with stone quoins and plinth, while the roof is covered with tiles. All the timber framing is English oak, cut from the solid.

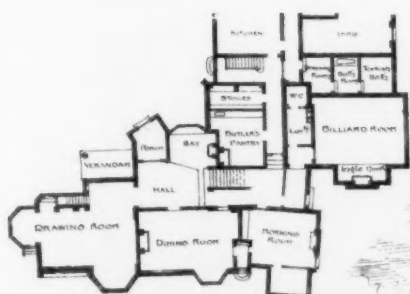
Terra-cotta works well with brickwork, and as we have now left behind us, as a thing of the past, much of the lobster red coloring in vogue some years ago, we may hope for more harmonious combinations of the two materials. In the jambs of windows, sills, lintels, mullions, etc., terra-cotta should be used more than it is. The house on Clarendon Street, designed as the rectory for Trinity Church, by the late H. H. Richardson (Figs. 5 and 6), is a fairly good example of brick treatment. It has a solid, substantial appearance, and decidedly "bricky" effect, enhanced, no doubt, by the red slate and tile roof. The way in which the windows are divided is admirable. The panels between the windows are of carved brick. Another architect, following on the same lines as this house, might now use in conjunction with the red brick, a brownish terra-cotta. One of the best examples in Boston of varied color brick treatment is the front of a small building on Park Square, for the Bay State





"Langley Park House", Watford.

W. Wallis Giddens Archt.



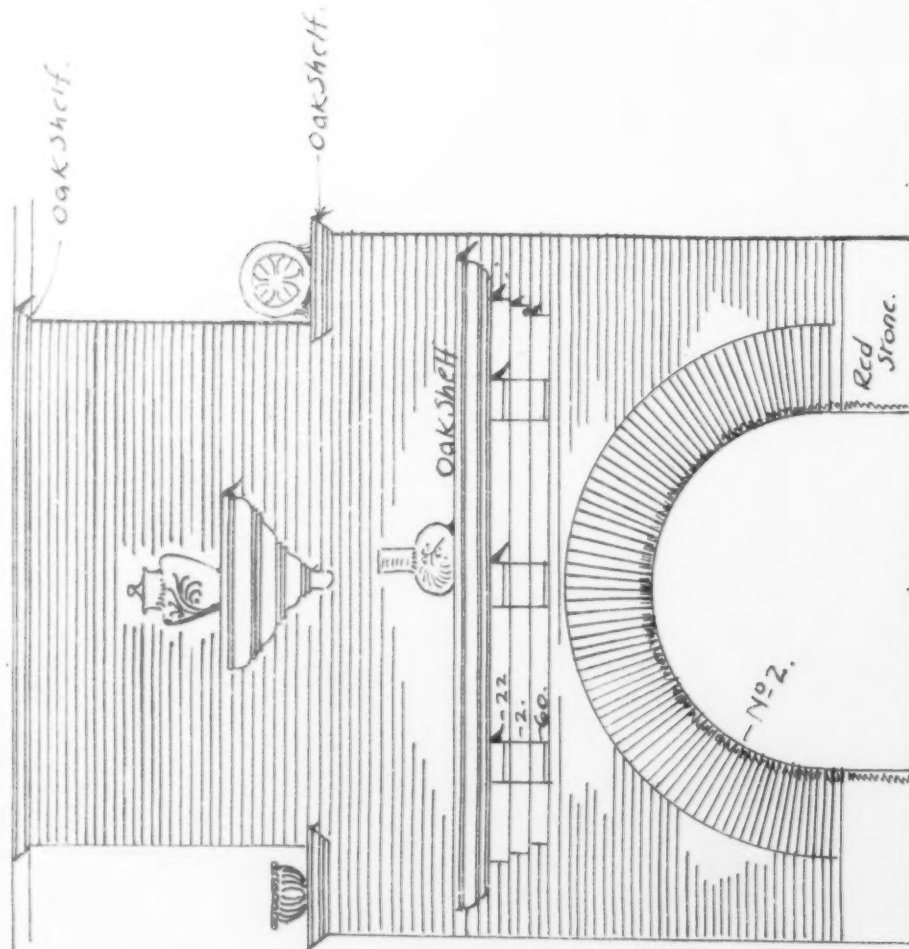
WIGHTWICK MANOR.  
STAFFORDSHIRE.  
GRAYSON & GULD ARCHT.

Forbes Co

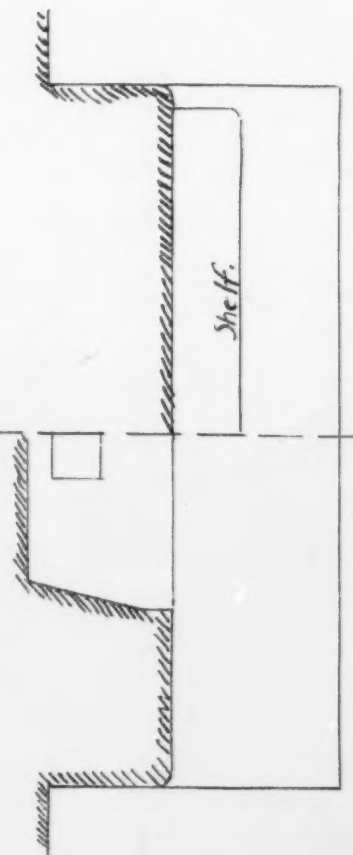
# THE BRICKBUILDER.

VOL. 1, NO. 6.

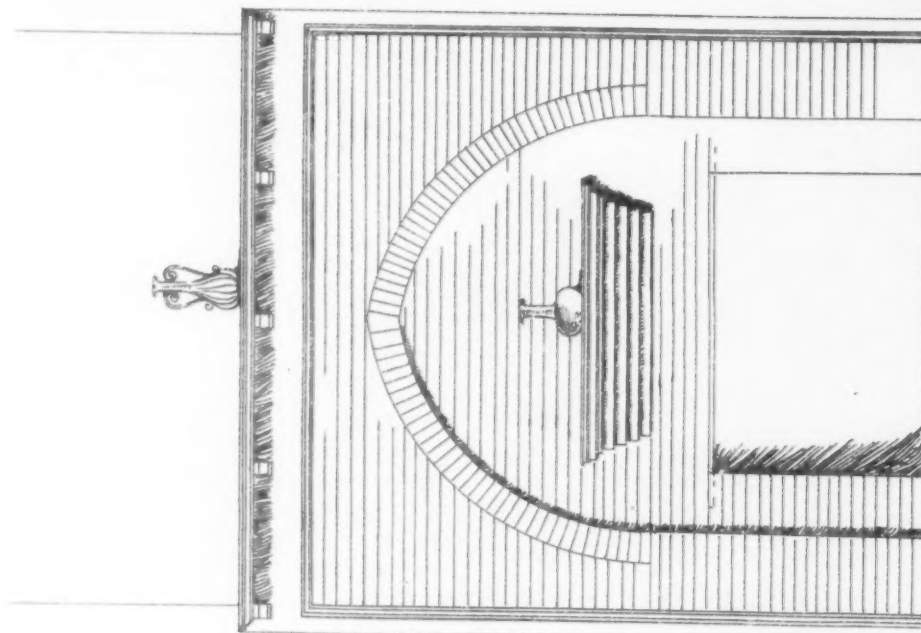
PLATE 42



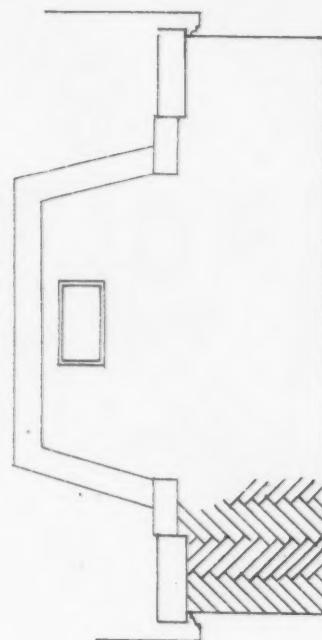
ELEVATION.



PLAN.

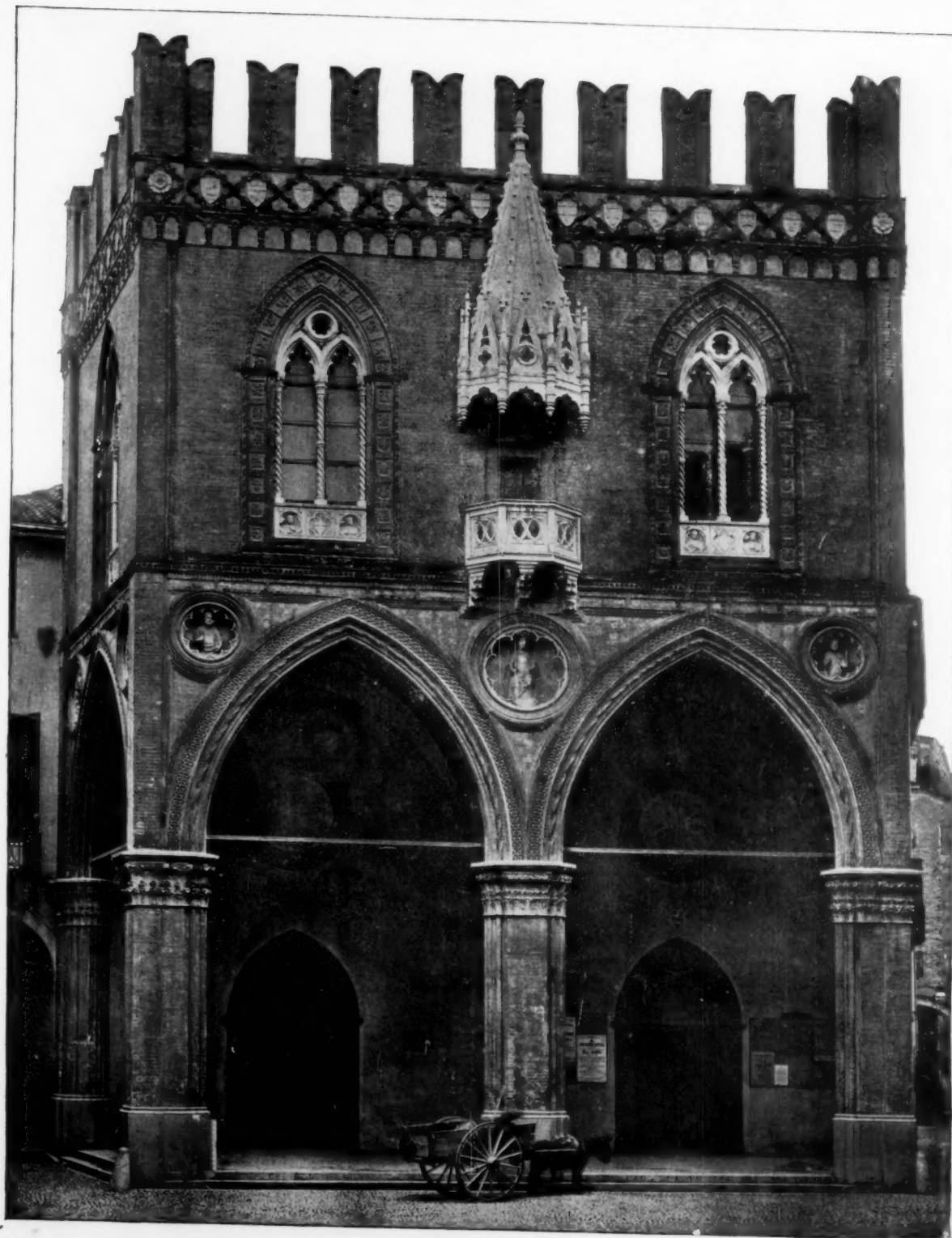


ELEVATION.





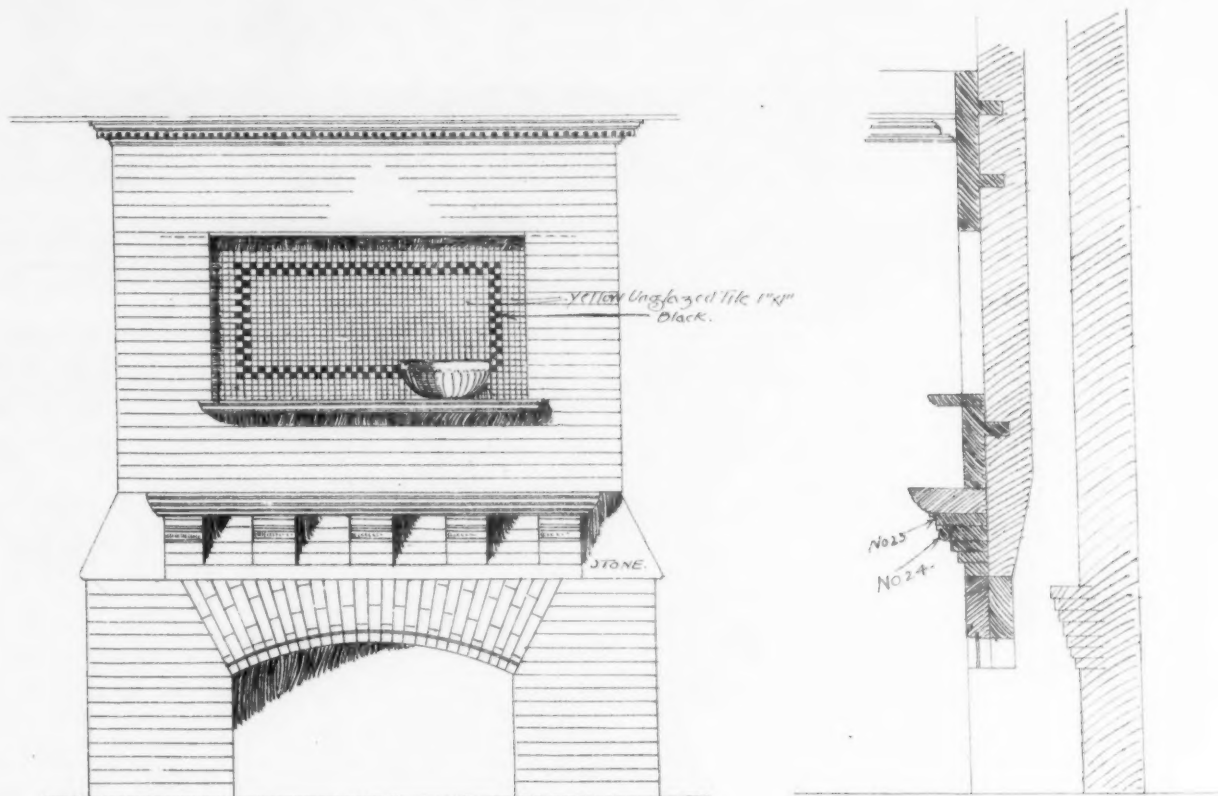
SUPPLEMENT TO THE BRICKBUILDER.  
JUNE, 1892.



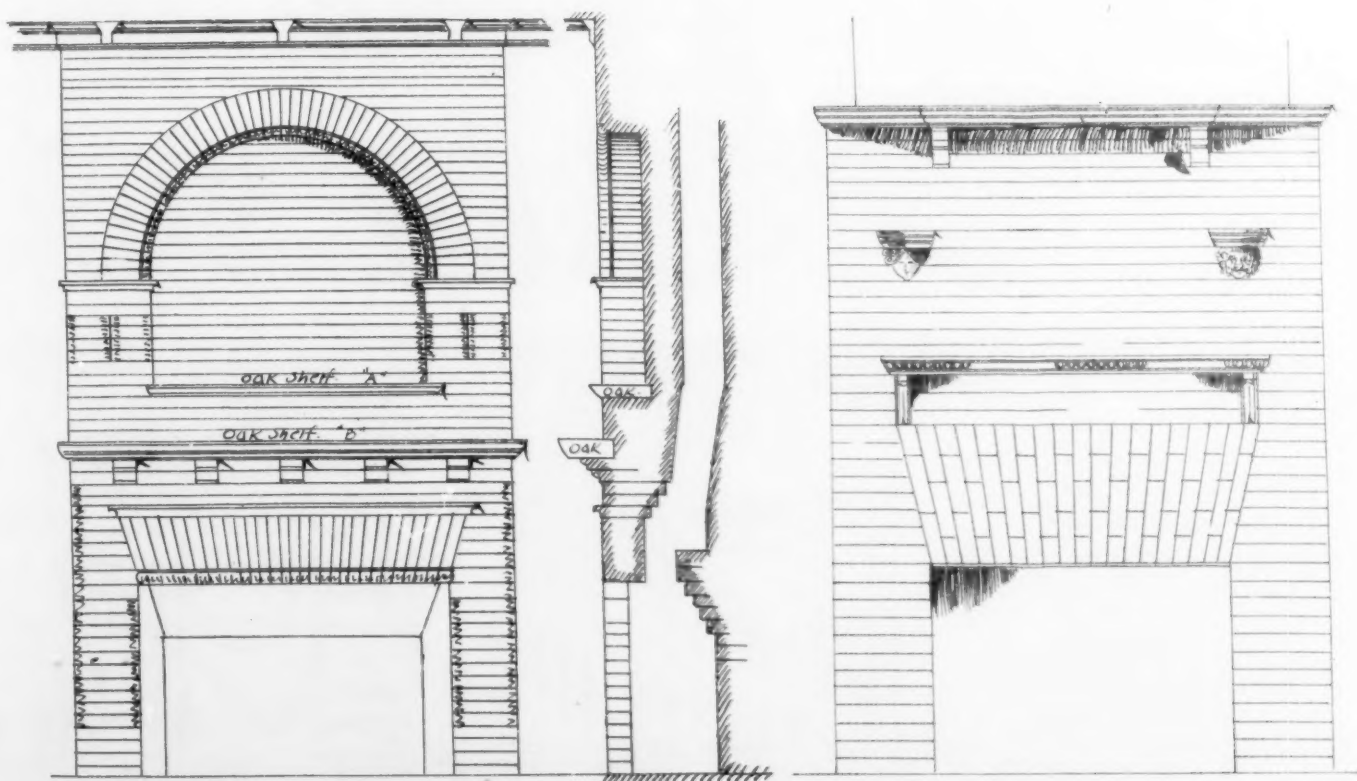
FORO DEI MERCANTI, BOLOGNA.  
Fourth of a Series of Photographs of Foreign Brickwork.







MANTEL IN "THE CLEVELAND DRIVING CLUB" HOUSE.

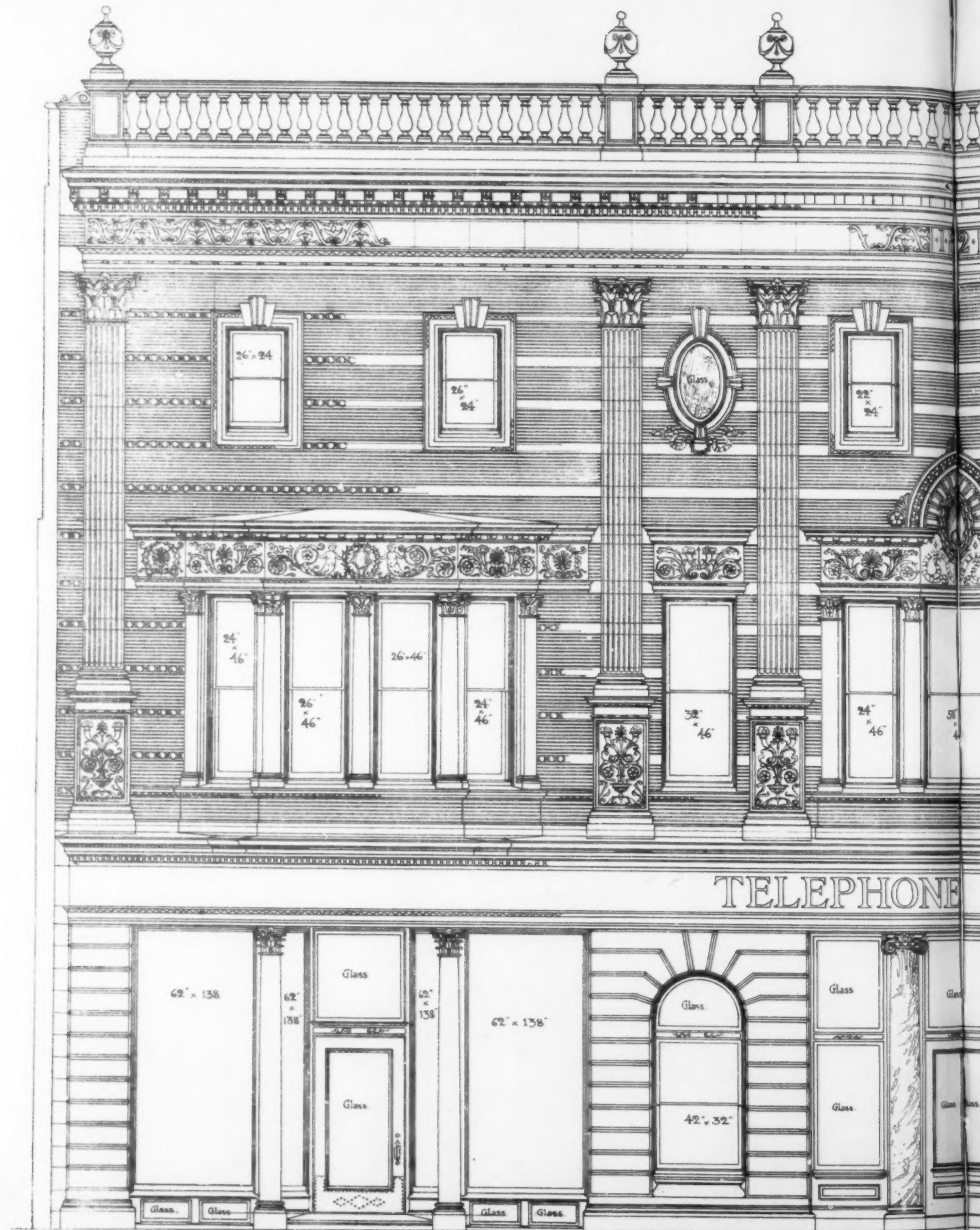


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MANTEL IN BILLIARD ROOM, RESIDENCE OF M. A. HANNA.

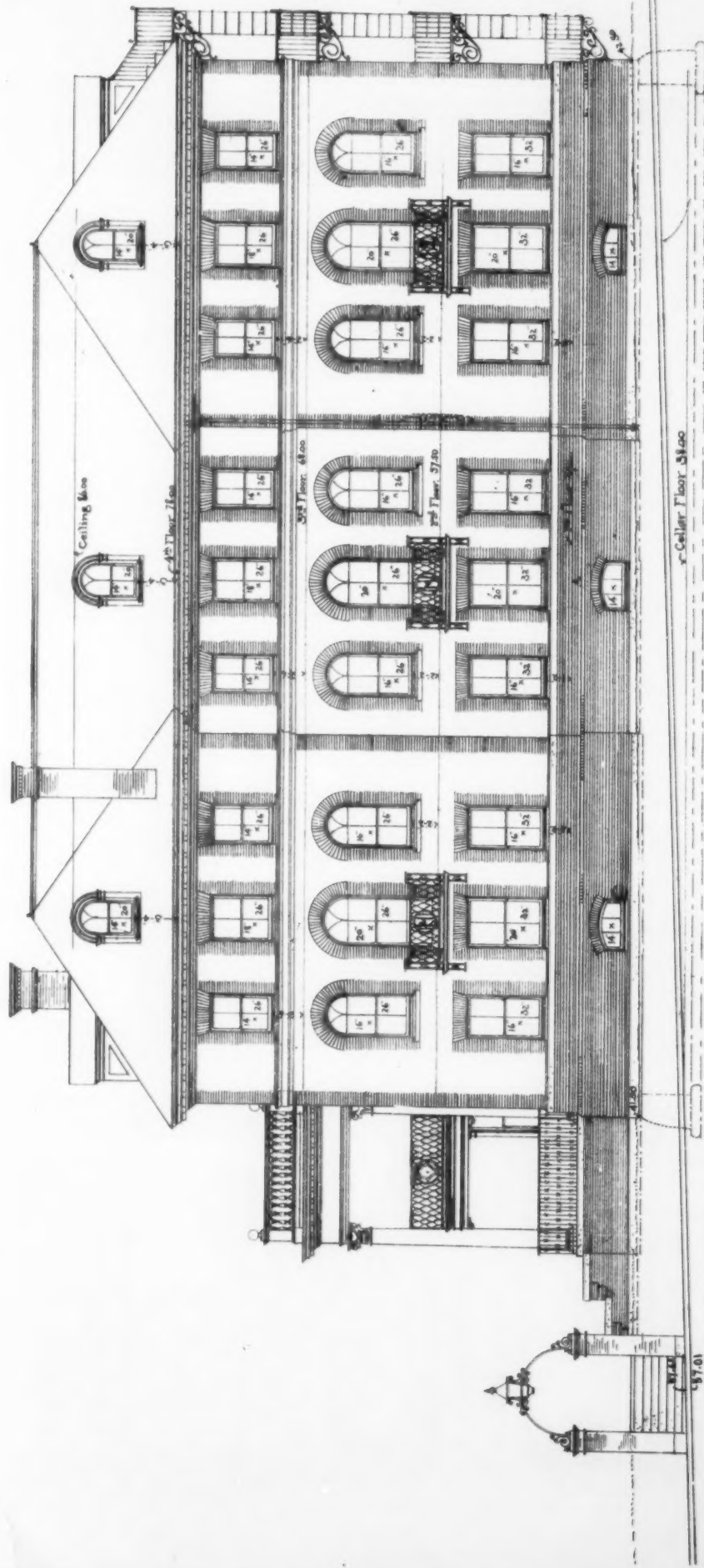
MANTEL IN LIBRARY, RESIDENCE OF S. M. STRONG.

C. F. SCHWEINFURTH, ARCHITECT, CLEVELAND, OHIO.









Plans of a Nurses Home  
for the Rhode Island Hospital  
Providence, R. I.

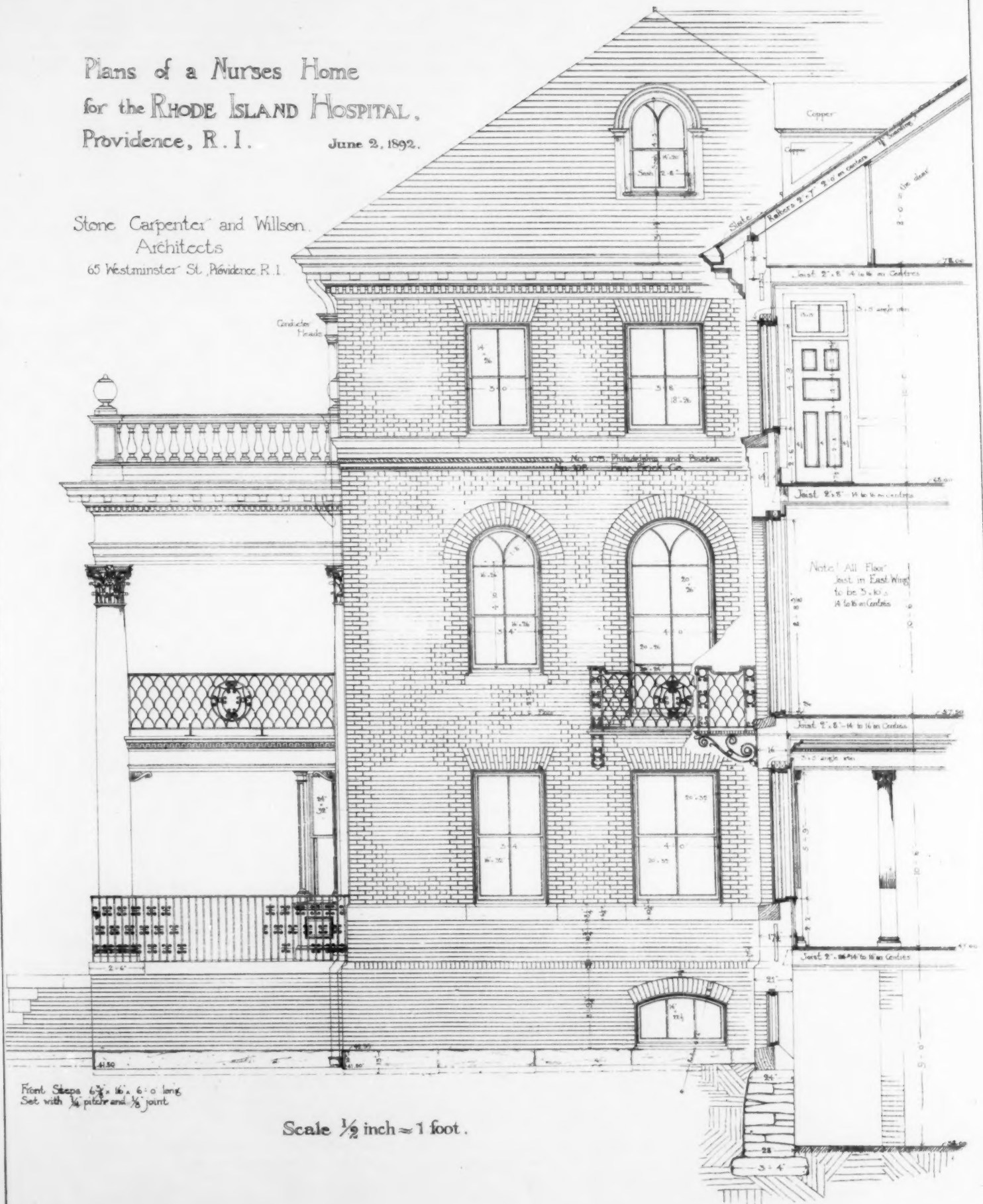
North Elevation.  
Lockwood St.

Scale  $\frac{1}{8}$  inch = 1 foot.



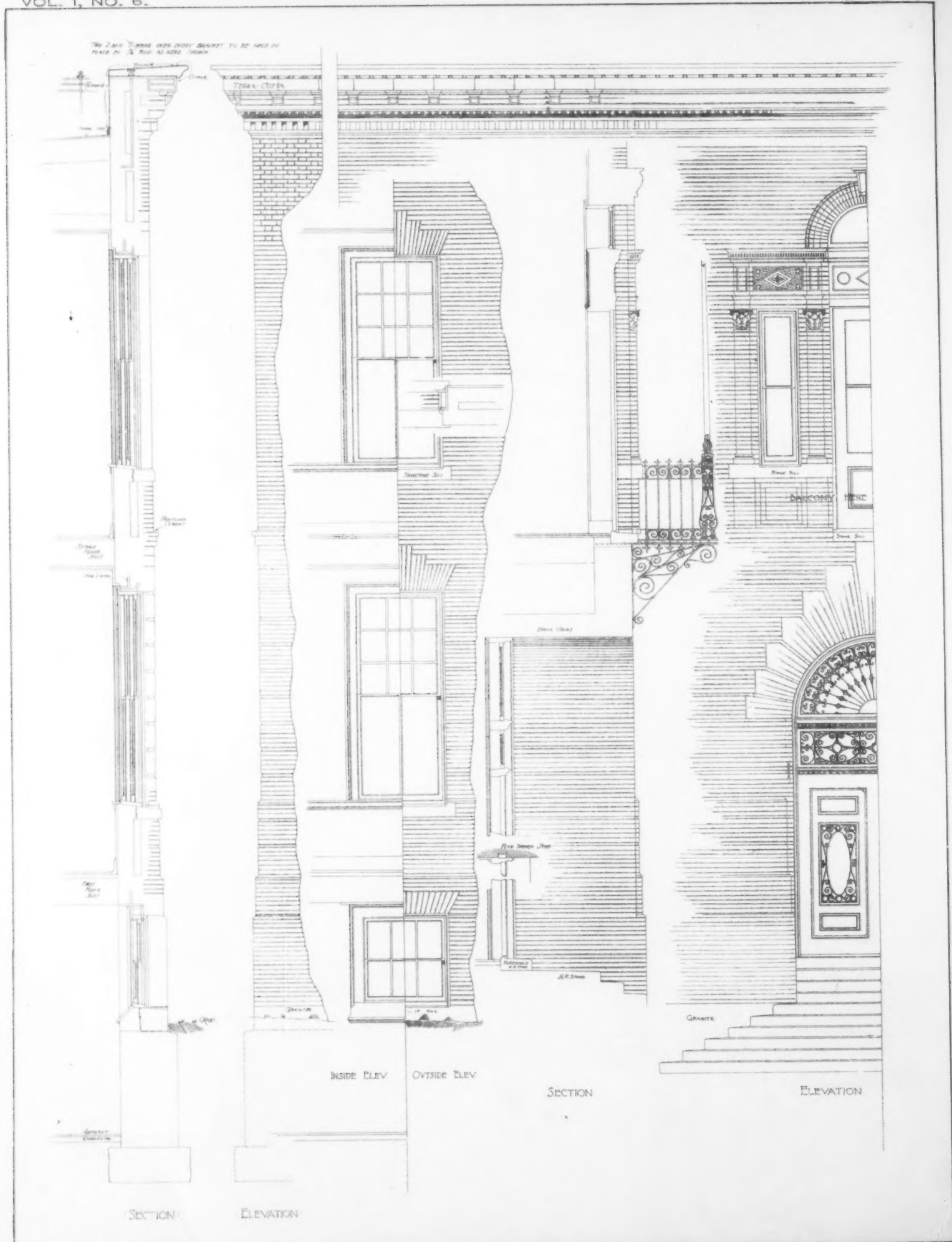
Plans of a Nurses Home  
for the RHODE ISLAND HOSPITAL,  
Providence, R. I. June 2, 1892.

Stone Carpenter and Willson  
Architects  
65 Westminster St. Providence, R. I.



Front Steps  $6\frac{3}{4} \times 16 \times 6-0$  long  
Set with  $\frac{1}{4}$  pitch and  $\frac{1}{8}$  joint

Scale  $\frac{1}{2}$  inch  $\approx$  1 foot.



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PRIMARY SCHOOL HOUSE, ON GLEN ROAD, HILLSIDE DISTRICT.  
E. M. WHEELWRIGHT, CITY ARCHITECT, BOSTON.



Trust Co., published in our issue for March, where a light brown is used with red to great advantage. There is just sufficient difference, without any hard contrast of light on dark, which we sometimes see.

Most architects must admit that if roofing tiles were more generally used a great improvement would be made in the architectural appearance of all our buildings. The tile is, firstly, non-combustible; it is enduring; it does not need paint, and it is a non-conductor of heat or cold; lastly, it is more artistic in appearance than slates or wooden shingles.

Some time ago the writer saw a house in the suburbs, the roof of which was covered with tiles imported from England. A well-known maker there has sent several shipments to this country and Canada. These tiles were of a very pleasing red color, and seemed to have been vitrified in the burning for they were as hard as iron.

I do not see why we cannot make as good tiles in this country, tiles that will be impervious to water and yet not brittle, so as to be damaged by frost. The color is also an important point, for there are some reds that never seem to tone down in the strong clear atmosphere of our climate. Even if we never used brick in building our suburban houses, but continued to use wood, it would be a great gain to have all our roofs covered with tiles.

But as time goes on we may learn to build more permanently, more on common sense principles. Then we will hope to see simple yet picturesque cottages in the outskirts of our cities built, it may be, with the commonest kind of brick, which our architects now know how to use, and that the clapboarded wooden house will become a thing of the past.

All that is needed is an awakened interest on the part of the public, and an opportunity for our architects to show how, with even the simpler and humbler forms of brickwork, the rural beauty of the country landscape may no longer be marred, but rather heightened and made humanly interesting by dwellings lovely in themselves.

ROBERT BROWN, JR.

#### BRICKS AND BRICKWORK.

A Lecture delivered at Carpenter's Hall, London, by Prof. T. Roger Smith, F. R. I. B. A.

(Continued.)

To make brickwork, however, another ingredient is required, namely, mortar or cement. All mortars and, in fact, all the cementing materials used (except bituminous ones) in bricklaying have lime as their base, and depend upon the setting quality of quicklime, which has to be mixed with sand, or some suitable substitute for it, to make mortars. Limes and cements are far too wide a subject to be dealt with as part of an evening's lecture on another topic, and no doubt they will hereafter form the subject of a lecture or lectures. To-night I propose only to remind you that there are such substances as these, and that they possess certain qualities and are obtainable and available for the bricklayer's purposes, without attempting an investigation into the chemistry of cements or the manufacture, etc. Ordinarily, brickwork may be divided into brickwork in mortar and in cement; but there are many qualities of mortar and several sorts of cement.

Mortar made with what are called fat or rich limes, that is to say, nearly pure lime, such as is got by calcining marble or pure chalk, sets slowly, with difficulty, and is rarely tenacious. Burnt clay or brick reduced to powder improves the setting of such lime, especially if the two materials be calcined together; so will an admixture of cement. Mortar made with what is known as slightly hydraulic lime, that is to say, lime containing a small proportion of clay, such as the gray-stone lime of Dorking, Merstham, and that neighborhood, sets well, and is tenacious and strong. Mortar made with hydraulic lime, that is to say, lime with a considerable admixture of clay, such as the lias lime, sets under water or in contact with wet earth. It is best to use this lime ground to powder, and not to mix so much sand with it as is used with stone lime. A sort of mortar called selenitic mortar, the invention of the late General Scott, has been made use of in many of the buildings of the school board for London, and was first employed on a large scale in the erection of the Albert hall. The peculiarity consists in the addition of a small dose of plaster of Paris (sulphate of lime), very carefully introduced and intimately mixed. The result is, that the mortar so made sets rapidly, and is very hard. It is claimed that a larger proportion of sand can be used with selenitic lime than with ordinary, thus counterbalancing the extra expense occasioned by royalty under the patent and special care in mixing.

The material which comes from the kiln is called quicklime, and,

on being dosed with water, it slakes and crumbles to powder, and in the state of slaked lime is mixed up with mortar. Cement-stones are also calcined; but the resulting material will not fall to pieces or slake under water. It must be ground very fine, and when moistened sets rapidly, and as well under water as in air, and becomes very hard and is very tenacious. Brickwork in mortar will always settle and compress to some extent. Not so brickwork in cement, which occasionally expands, but is never to be compressed. This quality, and the rapid setting, tenacity, and strength of brickwork in cement make it a most valuable material to use in those buildings, or parts of a building where great steadiness and strength are wanted, and in sewage and dock work where there is water to contend with. A good many cements made from natural stones used to be employed such as Medina, Harwich, Atkinson's, or Roman cement. The last-named is the only one which is now much employed, except locally. It has the quality of setting with exceptional rapidity, and is on that account sometimes the best material to employ; but for almost every purpose the artificial compound known as Portland cement is preferable.

Portland cement is made largely near Rochester. Its materials are simple and cheap. They may, without much departure from the truth, be said to be Thames mud and chalk; but the process of manufacture requires care and thoroughness. The article supplied, when of the best quality, has great strength, and is quick setting, and is far better than what was manufactured from stones in which the ingredients existed in a state of nature. In England we slake our lime and make use of it while it is fresh; but it may interest you to know that the custom in Italy and parts of France is different. There it is customary to slake the lime long before it is wanted, and to deposit it in a pit and cover it up with earth. In this condition it is left for months—I believe in Italy for a year—and when taken out it is stiff, but still a pasty substance. It is beaten, and more water added, and it is then made into mortar with sand.

It is claimed for mortar made in this way that it is exceptionally strong. Now that we have considered bricks and partly considered mortar, it remains to pay some attention to brickwork. The simplest and most familiar work for a bricklayer to do is to build a wall. In doing this his object should be to make it as stout as possible for the thickness, and this stoutness can only be obtained by interlacing the bricks. If they were simply laid on the top of each other the wall would be no more than a row of disconnected piles of brick liable to tumble down. When the whole is so adjusted that throughout the entire wall the joints in one course shall rest on solid bricks and shall be covered by solid bricks again—in short, when the whole shall break joint—then this wall is said to be properly bonded, and has as much stability given to it as it can possibly possess. There are two systems of bonding in use in London, known as English bond and Flemish bond. English bond is the method which we find followed in ancient brickwork in this country. In this system a course of bricks is laid across the wall, showing their heads at the surface, hence called "headers," and next above comes a course of bricks stretching lengthways of the wall called stretchers, and so on alternately. With the Dutch fashions came in Flemish bond, in which in each course a header and a stretcher alternate. In either case at the corners a quarter-brick, called a closer, has to be used in each alternate course to complete the breaking joint. There is not much to choose between these methods where the walls are only one brick thick; but where they are thicker the English has a decided advantage, for in walls built in Flemish bond of one and a half brick thickness or more there must be a few broken bricks or bats, and there is a strong temptation to make use of many. If this takes place the wall is unsound.

Many of the failures of brickwork in London houses arise from the external walls, where they are  $1\frac{1}{2}$  bricks thick, being virtually in two skins. The inner nine inches does the whole of the work of supporting floors and roof, and when it begins to fail the outer face bulges off like a large blister. I have known cases where this had occurred, and where there was no header brick for yards, so that one could pass a five-foot rod into the space between the two skins and turn it about. This is rather less easy to accomplish with English bond; and there are other advantages in the use of that bond which make it decidedly preferable, and it is now coming back into very general use. There are some odd varieties of bond, such as garden bond and chimney bond; but of these I only wish to draw your attention to what is called cross bond. The name is not quite a happy one. Diagonal bond is hardly better. The thing itself is to be often met with on the Continent, and it is almost unknown here;

but it would be worth introducing, as the effect of it is very good. French cross bond, otherwise diagonal bond (*liaison en croix*), is English bond, but with the peculiarity that in every fourth course one header is made use of in the stretcher course at the quoin. The result is that the stretchers break joint with each other, and all the joints range themselves in diagonal lines; and if in any part of the work headers of a different brick are introduced, the appearance of a cross is at once brought out, and even without this the diagonal arrangement of joints is very perceptible and pleasing.

Besides wall-building the bricklayer has many other works to perform. He has to form fireplaces, flues, chimneys, and the flat trimmer arches which support the hearth, and has to set the stove, kitchen-range, copper, etc., in a proper manner. He has to form various ornamental features and much else, some of which we shall have an opportunity of noticing rather later. The strangest business, however, which is intrusted to the bricklayer, is building downwards by the method known as underpinning, so that if a foundation has failed, a sounder one at a greater depth may be reached; or if a basement is required under an existing building which has none, the space may be excavated and the new walls built so as to maintain the old. This work has to be done with great caution, and bit by bit, and is usually left to experienced hands. The mode in which the mortar joints of a brick wall are finished where they show on the external or internal face, is a matter worth a moment's attention. It is important that the joints of the work shall be so finished as to keep out wet and to be as durable as possible, and it is desirable that they should improve, or, at any rate, not disfigure the appearance of the work. The method which architects strongly advocate is, that the joints shall be struck as the work proceeds, that is, that very shortly after a brick is laid, and while the mortar is yet soft, the bricklayer shall draw his trowel, or a tool made for the purpose, across it, to give it a smooth and a sloping surface. This is best when the joint is what is called a weather joint, *i. e.*, one in which the joint slopes outward. Sloping it inward is not good, as it lies in wet; finishing it with a hollow on the face is often practised, and is not bad. Bricklayers, however, most of them prefer that the mortar joints should be raked out and pointed, that is to say, an inch or an inch and a half of the mortar next the outer face be scratched out and replaced with fresh mortar, and finished to a line. In cases where the brickwork is exposed to frost this proceeding cannot be avoided, because the frost damages the external mortar of the joints; but the bricklayers prefer it at all seasons of the year, partly because brickwork is more quickly done if joints are not struck at the time, partly because they can, if they like, wash the whole surface of the work with ochre or other color, to improve the tint, and partly because whether the washing is done or not it smartens up the appearance of the work. The misfortune is that this pointing, instead of being the edge of the same mortar that goes right through, is only the edge of a narrow strip, and does not hold on to the old undisturbed mortar, and so is far less sound and far more liable to decay. There is a system of improving the appearance of old decayed work by raking out and filling up the joint, and then making a narrow mortar joint in the middle of this filling in and projecting from the face. This is called tuck-pointing; it is very specious, but it is not sound work.

Brick arches are constantly being turned, and of many sorts. An arch consists of a series of wedge-shaped blocks, known as voussoirs, arranged in a curve, and so locking one another together that, unless the abutments from which the arch springs give way, it will not only carry itself but sustain a heavy load. It is a constant practice to cut bricks to this shape and build them into an arch, and these are sometimes cut and rubbed. Sometimes when the work is rougher, they are axed; but in order to save the labor of cutting, arches are sometimes turned with the bricks left square and the joints wedge-shaped. In this case the rings should be only half a brick each, so that the wedge need not be so very much wider at back than at face, and they are set in cement, as that material adheres so closely and sets so hard. Arches of two or more half-brick rings in cement are good construction, and are also used for culvert work. A less satisfactory sort of arch is what is called the flat arch. Here, instead of being cambered as it ought to be, the soffit is straight; but the brickwork being deep, there is room enough for a true arch that does the work, and for useless material to hang from it. These arches are generally rubbed or axed, and are very common at the openings of ordinary windows; but no one who has studied construction can look at them without a kind of wish for at least a slight rise, were it only two inches. Sometimes when these straight arches are to be plastered

over, they are constructed in a very clumsy manner, which is anything but sound, and from time to time they give way. The weight of brickwork, of course, varies with the weight of the individual bricks; but stock brickwork in mortar weighs just about one hundred weight per cubic foot, or twenty cubic feet to the ton. In cement it is heavier; about 120 pounds to the cubic foot. The strength of brickwork depends, of course, on the strength of the weakest material, *i. e.*, the mortar; though when it is in cement the strength of brickwork to withstand a weight probably approaches that of the individual bricks. Some experiments quoted in Rivington's notes give the following as the crushing weight per foot; that is to say, weight at which crushing began, of piers having a height of less than twelve times their diameter:—

	Tons per foot.
Best stocks, set in Portland cement and sand, 1 to 1, and three months old . . . . .	40
Ordinary good stocks, three months old . . . . .	30
Hard stocks, Roman cement and sand, 1 to 1, three months old . . . . .	28
Hard stocks, lias lime and sand 1 to 2, and six months old . . . . .	24
Hard stocks, gray chalk lime and sand, six months old . . . . .	12

The rule given in a popular handbook, that brickwork in mortar should not have to carry more than three tons per superficial foot, and in cement more than five tons, is probably sound, as in no building ought the load to approach the crushing point, and indeed there are many sorts of foundations on which such a load as five tons per foot would be too great to be advisable. It is a rather interesting inquiry, whenever we are dealing with a building material, if we ask what can we best do with it, and for what is it ill fitted. The purpose for which brick can be best used depends, of course, upon its qualities. Speaking generally, such purposes are very numerous, and very various, especially the utilitarian purposes, though rich and varied ornamental work can also be executed in brickwork. Perhaps the most remarkable quality of brickwork is that it can be thrown into almost any shape. It is in this respect almost like a plastic material, and this peculiarity it owes chiefly to the very small size of each brick as compared with the large masses of the brickwork of most buildings. Stone is far less easily dealt with than brick in this respect. Think for a moment of the great variety of walls, footings, piers, pilasters, openings, recesses, flues, chimney breasts, chimney shafts, vaults, arches, domes, fireproof floors, corbels, strings, cappings, panels, cornices, plinths, and other features met with in constant use, and all formed by the bricklayer with little trouble out of the one material—brickwork. A little consideration will convince you that if the same material furnishes all these it must be very plastic. As a limitation we ought to note that this almost plastic material cannot be suddenly and violently dealt with—that is to say, that with the exception of some sorts of arches, you cannot form any abrupt or startling feature in brickwork, and you are especially limited as to projections.

If you wish to throw out any bold projection, you may support it on a long and sloping corbel of brickwork; but if there is not room for that, you must call in some other material, and from the actual support in stone or terra-cotta or iron, and when you have gained your projection you may then go on in brickwork if you like. Brick cornices should be steep, but cannot be bold, and so with other ornamental and structural features. A noteworthy property of brickwork, and one of immense value, is that it is thoroughly fireproof; in fact almost the only perfectly fireproof material.

There is an interesting account of the great fire of London by one of the eye-witnesses, and among the striking phenomena of that awful time he notes that the few brick buildings which existed were the only ones able to withstand the raging fire when it reached them. In our own day a striking proof of the same thing was given in the great fire in Tooley Street, when Braidwood lost his life. I witnessed that conflagration for a time from London Bridge, and its fury was something not to be described. There were vaults under some of the warehouses stored with inflammable materials, the contents of which caught fire and burnt for a fortnight defying all attempts to put them out; yet these very vaults, though they were blazing furnaces for all that time, were not materially injured. When the warehouses came to be reinstated, it was only found necessary to repair and repaint them a little, and they were retained in use. The fact is, that the bricks have been calcined already, so has the lime in the mortar, and the sand is not affected by heat, so there is nothing in brickwork to burn.

(To be continued.)



## "STOCKS" VERSUS "GAULTS."

A correspondent to one of our English contemporaries writes as follows concerning the London market:—

"The increasing adoption of 'gaults' must be affecting many fields where the good old 'stock' is the staple article of manufacture. This increase must have been noticed by very many. The future promises to see a still further development. Frequently now, the gault is usurping the place of picked stocks for facings, and for inside work gault bricks seem to be almost ousting the stock from the market. This cannot but be felt severely in quarters where gault clay does not occur. The question then arises, Why the neglect of the stock? Builders say they cannot now get good sound stocks as of yore, and that a front of picked gaults is equal to a front of picked stocks, which may be true as regards evenness of color, but scarcely so with respect to durability. There is too much flake about the gault, and the quality of the brick varies greatly. To my mind, nothing equals in effect and durability the old-fashioned, well-made, well-dried and turned hand-made stock; but such bricks seem, unfortunately, to be becoming unknown in London, and the machine-made, pale-faced gault daily more in use. I suppose it is all a question of pounds, shillings, pence.

"One may imagine, therefore, that what with the still raging red-brick fever, and the rise and progress of the gault, the poor old stock is hard driven. Seeing that it is no good at all for facings in dirty, sooty London, and that even if it were, the red brick would cut it out in nine cases out of ten, and seeing, further, that the gault is now used generally for backings and internal walls, the demand for stocks in London must be a fraction of what it was some years ago. Locally, in the country, the stock may still reign supreme.

"When an architect chances upon a job in a district where really excellent stocks are procurable, he should try his hand at something artistic with stocks for the main facings. So great has been the rage for red brickwork in country and town, that the admirable effects to be obtained from stocks, when of sound texture and of bright golden and orange-gray hues, seem to be in danger of ranking among the lost arts. Occasionally we find a building in which the capabilities of the humble stock have been developed. In the country, the stock remains clean and bright, and instead of blackening, as in London and other smoky cities, grows mellow with age. The depressing hue of old stock-brick fronts in London is enough to make architects, who may be so fortunate as to live in view of a prospect mostly composed of such, forswear forever the use of such bricks for facings; but in the country the native stock would often be capable of more effective treatment than the results of attempts at red-brick making with miserably unpromising materials."

For those of our readers unacquainted with the terms used in the English brick market, we offer the following explanation, based on the classifications given in the South Kensington notes on Building Construction, the standard authority.

"Stocks" are hard burned bricks, fairly sound, but more blemished than "shippers," which are chiefly exported, ships often taking them for ballast. They are used for the principal mass of ordinary good work. "Hard stocks" are overburnt bricks, sound, but considerably blemished both in form and color. They are used for ordinary pavings, for footings, and in the body of thick walls.

"Gaults" are made from a band of bluish tenacious clay which lies between the upper and lower greensand formations. This clay in its natural state contains sufficient chalk to flux the mass, and to give the brick a white color. The bricks made from this clay are of a very good quality, extremely hard throughout, very durable, but difficult to cut. They are generally white, but the lower qualities have a pink tinge caused by irregularities in burning. Bricks made from gault clay are generally very heavy. To remedy this a large frog is sometimes formed in the brick, or it is perforated throughout.

## WANTED.

The publishers of THE BRICKBUILDER wish to secure an active, energetic representative in every city and town in the United States and Canada. Such a representative can, without interfering with his regular work, secure an additional income, which he can, to a certain extent, hold, year after year, without any particular effort. This is a good chance for young men to secure not only a good paying but pleasant employment, which will not seriously encroach upon their time. For particulars address the publishers, stating age, present employment, and population of the territory you could cover.

## CORRESPONDENCE.

BLUFF SPRINGS, FLA.

THE BRICKBUILDER PUBLISHING CO.

Gentlemen,—I am in receipt of a specimen copy of your very excellent monthly magazine. I have been in the brickmaking business over sixty years, in four of the Northern States and seven of the Southern States. I have also done a great deal of building, being a brick layer as well as brick maker. Perhaps no man living has had so long and so varied an experience in brick and brickwork. I look back when my trade and calling stood at the very foot of the mechanical arts, without a single voice, and I may say capability, to say a word for it, and now with great pride and real pleasure I look out at the marvellous transformation, at all parts of our country, in the clay-working line. I see capital, intelligence, invention, and literature at the head of it, with a combined interest and purpose, and I may say ability, to make our craft second, in importance and progress, to no other in the United States.

I congratulate you on your excellent object and appearance. You will fill a gap that none of your contemporaries can well do, viz. Show us how to build a brick house as well as to make the brick for it. I have written nearly three years for *The Clayworker*, and am perhaps the only writer for that journal that has said anything about brick laying and building. In my humble opinion, the whole business of brick building, as well as city building, requires revision and improvement, and I am glad to see that you have made a specialty of this very important part of our building industry. I do not think we build in our cities to suit either the true laws of health and economy, or to produce the best effect in architectural beauty. I think you should declare war on narrow streets and very high buildings, as well as on all kinds of tentative showy work inconsistent with strength, utility, durability, and symmetrical proportions. The idea of building a house four or five times higher than its width, just to get in a profusion of architectural enrichments, is absurd. There is a question of political economy (in the abstract) connected with our very bad, imperfect system of building, in which the general public have some interest and implied rights. Fireproof, health, and morals are subject-matter for the public to consider in giving building permits.

Very truly yours,

J. W. Crary, Sr.

HARTFORD, CONN.

BRICKBUILDER PUBLISHING CO.

Dear Sirs,—In your notice of brick church design, you say it would look best with red brick having wide joints of white mortar. Why white, instead of dark red or brown? Wouldn't the latter give a richer effect, bringing out each brick by forming a shadow line all around it?

The old usage in brickwork was the jointing in mortar, which always gave a raw, glaring effect. It was seldom satisfactory (except when very narrow joints were used) till after many years had dirtied the white lines, and brought them more into harmony with the mass.

Yours respectfully,

W. P. CRABTREE.

Our fields of good clay were never given us to be made into oblong morsels of one size. They were given us that we might play with them, that men who could not handle a chisel might knead out some expression of human thought. In the architecture of the clay districts of Italy every possible adaptation of the material is found exemplified, from the coarsest and most brittle bricks used in the mass of the structure to bricks for arches and plinths cast in the most perfect curves and of almost every size, strength, and hardness; and moulded brick wrought into flower work and tracery as fine as raised patterns upon china. And just as many of the finest works of the Italian sculptors were executed in porcelain, many of the best thoughts of their architects were expressed in bricks, or in the softer material of terra-cotta; and if this were so in Italy where there is not one city from whose towers we may not descry the blue outlines of the Alps or Apennines, everlasting quarries of granite and marble, how much more ought it to be so among the fields of England?—*John Ruskin in Stones of Venice.*

### SELL MORE BRICKS.

AN OPEN LETTER OF SUGGESTION TO BRICKMAKERS.

Which is harder; to make bricks enough to fill your orders, or to sell all the bricks you can make? Can you not make more bricks than you can sell? If there were a market for twice your present output, would you not double your plant and force of workmen? Certainly you would,—if you have the clay to use, and can make bricks at a profit. Now why not double your market? You have the best building material in existence; yet you stand by and see three quarters of the building done with wood or stone. Why not work to increase the number of buildings built of brick and decrease those of stone or wood? You can do it, and it is money in your pockets.

Do you know that there are several publications devoted to designs and details for frame buildings, that these publications are taken by lumber dealers, and sash and door makers, distributed by them among their customers, shown to contractors, to people about to build? Do you also know that prior to this year there was not a single publication in the world devoted to brick architecture, to showing plans and details for brick buildings, to publishing information about bricks and brickwork? There were several good journals devoted to making bricks, but none to making a larger and better market for them. *THE BRICKBUILDER* is the only periodical in the world devoted to this important interest of brickmakers. Is it not quite as important to *sell* bricks as to *make* them? What good is your business without its market? The larger this market, the better the business. You may say that bricks must be *made* before they are *sold*—that we are “putting the cart before the horse.” Not by any means. There is not a brickmaker in the country that does not consider his market before he does his means of supplying it. There is not one of you who would make bricks without a market in view—therefore the *selling* is the first and *most important* consideration. *THE BRICKBUILDER* proposes to help you sell more bricks. To do this you must meet it half way; without your doing your part it must be slow work. Our part is this: We are publishing designs of brick, or brick and terra-cotta buildings, showing what the leading architects in all parts of the country are doing; we publish photographs of brickwork that has been done in Europe in times past, giving, as every one knows, valuable ideas for modern work; we publish details to scale, of arches, cornices, chimneys, fireplaces, and similar features, designs of storefronts, houses, churches, schools, stables, etc., of direct use to the architect and builder; we publish articles showing what is being done in different American cities, illustrated by drawings and photographs, articles calling attention to the strength and durability to the fire resisting qualities of brick and other clay building materials; articles suggesting artistic treatment of brickwork, etc., etc.

Now to return to our original subject, *i. e.*, the selling of more bricks. How will you do it? In the first place, don't let any one build a wooden building if you can help it. Fight for the use of brick in every way; and in this fight you will find no better weapon than this paper. Subscribe to it,—it costs but a nominal price per year, \$2.50,—keep it in your office, read it, examine the designs, and see in how many ways and how many times during the year it will pay for itself.

As a simple instance to illustrate its use: John Smith is building a store. Its front is to be of brick, but he thinks, in fact he has about decided, to put a galvanized iron or wooden cornice on it. *Don't let him do it.* In the first place it will not last so long, and if there is a fire near by the wooden one may have to be replaced if it does not help burn down the whole store. It must be painted every little while. If it is at all ornamental it is more costly, and *last, but not least, it doesn't do you any good.* If you induce him to use a brick cornice it means adding another thousand or more bricks to the order. It is easy to induce him—he uses wood or sheet-metal to get an ornamental effect he thinks he cannot get with bricks. A few copies of *THE BRICKBUILDER* will show him beautiful cornices of all styles and of varying degrees of ornateness. In fact, the next number will contain some fifty or more designs for cornices. Ten to one he will find a design he prefers to the iron or wooden one. You have scored a point. If you are progressive, if you are awake to business, you can score points like this every week; you can get bricks used where they were not contemplated, and you can sell these bricks, and remember that is what you are in business for.

A subscription to *THE BRICKBUILDER* costs \$2.50 a year. Besides

the general information in regard to brickwork that it brings you every month, it gives one hundred sheets of practical designs and details during the year, a large number of small illustrations, and twelve beautiful supplements. When you have examined a copy, if you do not want to keep it, give it to some mason builder, or to some person who is about to build; it will do good work for you. We urge you to try this plan for a year. Send us your check for \$2.50, together with your full address, and you will receive the paper one year sent *flat* not *rolled*. In support of this request let us call your attention to a few letters from prominent brickmakers, reprinted on the inside page of the back cover of this number. If you would like to supply all your regular customers with complimentary yearly subscriptions,—one of the best advertisements, by the way, you could get,—write us for our special terms, stating number of copies wanted. On such orders we make liberal discounts.

THE BRICKBUILDER PUB. CO.

### THE BRICKBUILDER COMPETITIONS.

**RULES:** All drawings must be sent in marked with some motto or device, and accompanied by a sealed envelope marked with the same, containing the full address of the competitor. The designs are judged by a committee of well-known architects, solely upon their merits, the names of the designers remaining unknown until the award is made, when the sealed envelopes corresponding to the devices on the designs are opened. To protect the interests of our advertising patrons it is stipulated that no ornamental bricks not found in their catalogues shall be used. This is really no restriction, for practically all of the leading manufacturers will be found represented in *THE BRICKBUILDER*. To encourage the study of effective use of the commoner materials, of two designs equally good, preference will be given that showing a skilful use of ordinary bricks to secure ornamental effect.

The results of competition No. 3 will be published in the next issue. We are glad to state that not only many more designs have been sent in, but that they are of better quality throughout. We submit below the programme for the sixth competition, and again urge all designers to enter.

#### COMPETITION NO. 6.

AN ARCHED WINDOW OPENING.

**Programme.** It is required to design one of a series of round arched windows in the façade of a building, the window opening to be three feet wide from brick jamb to brick jamb, and six feet high from top of sill to soffit of arch at its crown. The window is to be entirely surrounded by a plain wall surface. The sill may be of terra-cotta or stone, or bricks laid in cement. The ornamental work may be carried wholly around the opening or confined to the arch. Two colors may be used, if desired, and in that case the designer referred to the rendering of plate 10, No. 2 of *THE BRICKBUILDER*, where the light portions are masked by paper cut to the desired shape, and then the spatter work done by using a stiff brush, like a tooth or nail brush. Drawings are to be made in elevation, to a scale of three quarters of an inch to the foot, upon Bristol-board or some other smooth surface paper. *Do not use cold-pressed Whatman.* They must be delivered *flat*, postage or express prepaid, at the office of *THE BRICKBUILDER*, 4 Liberty Square, on or before Sept. 15, 1892.

Prizes will be awarded as follows: First prize, \$5.00; second prize, \$4.00; third prize, \$3.00; fourth prize, \$2.00; five fifth prizes of \$1.00 each. *THE BRICKBUILDER* reserves the right to publish any or all the designs submitted.

### THE ILLUSTRATIONS.

Plate 41. Examples of Modern English Brick and Timber Architecture. See article on page 43.

Plates 42 and 43. Designs for Brick Mantels. C. F. Schweinfurth, Architect, Cleveland, Ohio.

The perspective of this building was published in the February *BRICKBUILDER*. The plate in the present number reproduces the three-quarter scale detail.

Plates 44 and 45. The building for the Bell Telephone Co., at Providence, R. I. Stone, Carpenter & Willson, Architects.

Plate 46. Building for the Nurses' Home, Rhode Island State Hospital. Stone, Carpenter & Willson, Architects.

Plate 47. Three-quarter scale detail of above.

Plate 48. Glenn Road School, Jamaica Plain, Mass. Edmund M. Wheelwright, City Architect, Boston.